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(54) MICROCAPSULE COMPOSITION FOR HARMFUL ORGANISM CONTROL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a technique for controlling a releasing rate of an active component of a harmful organism controlling agent through a microcapsule membrane, for the releasing rate of the active component through a microcapsule membrane is generally reduced, therefor initial effects are sometimes insufficient though residual effects are excellent, and, in some cases, the active component cannot be effectively used, because of remaining thereof in the capsule, and, on the contrary, the initial effects are excellent but residual effects are insufficient and a chemical injury is caused, when encapsulating the harmful organism controlling agent.

SOLUTION: This microcapsule composition for a harmful organism control is obtained by using a harmful organism controlling agent as a core material and encapsulating the harmful organism controlling agent in a polyurea-membrane miclocapsule by polymerizing a polyfunctional isocyanate with a polyfunctional amine by a surface polymerization method. The polyfunctional isocyanate comprises an aromatic isocyanate and a non-aromatic isocyanate and the releasing rate of the active component of the harmful organism controlling agent through a microcapsule membrane is controlled by regulating the both ratios of the polyfunctional isocyanate to the core material and the aromatic isocyanate to the total isocyanate.

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CLAIMS

[Claim(s)]

[Claim 1] This pest control agent made to dissolve in the pest control agent and/or difficulty water soluble solvent whose solubility to 20-degree C water is 1% or less is used as the heart matter. A poly urea film microcapsule is made to connote by interfacial polymerization by multiple-valued isocyanate and the polyfunctional amine. These multiple-valued isocyanates are aromatic series isocyanate and non-aromatic isocyanate. The pest control microcapsule constituent which is characterized by the aromatic series isocyanate in the multiple-valued isocyanate whole quantity being 5 - 80 % of the weight and by which the bleedoff rate to the outside of the film of the pest control active ingredient in a microcapsule was controlled.

[Claim 2] The pest control microcapsule constituent according to claim 1 characterized by the multiple-valued isocyanate ratio in oil being a ratio (% of the weight) of the following formula -1 and a formula -2 within the limits in the relation between the weight ratio y of the multiple-valued isocyanate in oil, and the aromatic series isocyanate weight ratio x in the multiple-valued isocyanate whole quantity when the heart matter and mixture of multiple-valued isocyanate are used as oil.

[Equation 1]

$$y = -0.015x + 2.0 \text{ (formula -1)}$$

[Equation 2]

$$y = -0.13x + 20.0 \text{ (formula -2)}$$

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the microencapsulated constituent by which it comes to control the bleedoff rate of a pest control active ingredient.

[0002]

[Description of the Prior Art] Various the approaches of microencapsulating a pest control agent until now and controlling bleedoff of an active ingredient are proposed. For example, a ligninsulfonic acid salt is used as an emulsifier. The manufacture approach of a microcapsule of making it reacting with a polyfunctional amine as multiple-valued isocyanate using polymethylene polyphenyl isocyanate, and making a water-immiscible herbicide connoting in the poly urea film (JP,63-32761,B), The mixture constituent of the microcapsule which enclosed N-chloro acetyl cyclohexene amine which has a herbicidal action in the capsule film of poly urea (JP,63-230606,A), An approach, an agricultural-chemicals constituent (JP,7-165505,A), etc. which add the polyethylene oxide of mean molecular weights 150-8 million and/or the polypropylene glycol of mean molecular weights 134-300 in the coat of a microcapsule, and carry out bleedoff control are mentioned.

[0003]

[Problem(s) to be Solved by the Invention] Although bleedoff out of the microcapsule film of an active ingredient was generally controlled and the pest control agent constituent which microencapsulated was excellent in residual effectiveness, initial validity is imperfection in many cases, and the case where an active ingredient remained in a capsule and it could not use effectively had it. Since the pest control agent microcapsule constituent of this invention can control bleedoff out of the microcapsule film of an active ingredient, initial validity and residual effectiveness are excellent.

[0004]

✓ [Means for Solving the Problem] A poly urea film microcapsule is made to connote this invention by interfacial polymerization by multiple-valued isocyanate and the polyfunctional amine by using as the heart matter this pest control agent made to dissolve in the pest control agent and/or difficulty water soluble solvent whose solubility to 20-degree C water is 1% or less, these multiple-valued isocyanates are aromatic series isocyanate and non-aromatic isocyanate, and aromatic series isocyanate is 5 - 80 % of the weight to the whole quantity of multiple-valued isocyanate. Furthermore, in the ratio y of the multiple-valued isocyanate to the heart matter, and the relation of the ratio x to the multiple-valued isocyanate whole quantity of aromatic series isocyanate, it is preferably related with the pest control microcapsule constituent by which the bleedoff rate to the outside of the film of the pest control active ingredient in the microcapsule with which the ratio of the multiple-valued isocyanate to the heart matter is characterized by being the ratio (% of the weight) of the following formula -1 and a formula -2 within the limits was controlled, and is [0005].

[Equation 3]

$y = -0.015x + 2.0$ (formula -1)

[0006]

[Equation 4]

$y = -0.13x + 20.0$ (formula -2) Although it excels in quick action when there are few ratios of the multiple-valued isocyanate to the heart matter than a formula -1, residual effectiveness may be inferior or phytotoxicity may arise. Moreover, when [than a formula -2] more, bleedoff of the active ingredient to the outside of the capsule film is controlled, and an initial effect may be unable to be inadequate, or an active ingredient may remain in a capsule and it may be unable to use effectively.

[0007]

[Embodiment of the Invention] This invention is explained below at a detail. Although the pest control agent of this invention may be mixed with a difficulty water soluble solvent as long as the microencapsulation approach has a liquefied pest control agent, the mixed dissolution of the multiple-valued isocyanate is carried out what could use even if it remained as it is, and was dissolved in the difficulty water soluble solvent when it was a solid-state (it is described as the heart matter below). A polyfunctional amine is made to be able to add, making it distribute in the water solution which dissolved the dispersant, and agitating these oil, and the capsule film of poly urea can be made to form in a particulate material front face. If the water solubility of this pest control agent is high in that case, formation of the capsule film on the front face of a particle becomes a defect, and a good microcapsule cannot be manufactured.

[0008] The multiple-valued isocyanates used by this invention are aromatic series isocyanate and non-aromatic isocyanate, and aromatic series isocyanate is 5 - 80 % of the weight to the whole quantity of multiple-valued isocyanate. Although aromatic series isocyanate is excellent in quick action among the multiple-valued isocyanates used here with the amount used smaller than 5%, residual effectiveness may be inferior or phytotoxicity may arise. Conversely, from 80%, by many amount used, bleedoff of the active ingredient to the outside of the capsule film is controlled, and an initial effect may be unable to be inadequate, or an active ingredient may remain in a capsule and it may be unable to use effectively.

[0009] Furthermore, in the relation between the ratio y of the multiple-valued isocyanate to the heart matter, and the ratio x to the multiple-valued isocyanate whole quantity of aromatic series isocyanate, the pest control microcapsule constituent by which the bleedoff rate to the outside of the film of the pest control active ingredient in a microcapsule was controlled when the ratio of the multiple-valued isocyanate to the heart matter made it the ratio (% of the weight) of a formula -1 and a formula -2 within the limits like drawing 1 can be obtained preferably.

✓ [0010] The pest control agent applied to this invention For example, an insecticide, miticide, It has the property which are a germicide, a herbicide, a plant growth regulator, an insect pheromone, etc., dissolves in the oily liquid or difficulty water soluble solvent of nonaqueous solubility or difficulty water solubility which is 1% or less of solubility to 20-degree C water, and becomes a liquid. Specifically, it is (1) O-(3, 5, 6-TORIKURORO-2-pyridyl) O and O-diethyl as an insecticide and/or miticide. Phosphorothioate {chlorpyrifos}

(2) O and O-dimethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate {diazinon}

(3) O and O-diethyl O-5-phenyl isoxazole-3 IRU-phosphorothioate {isoxathion}

(4) O-ethyl O-2-isopropoxy-carbonylphenyl Isopropyl phosphoroamido thioate {isofenphos}

(5) O and O-diethyl-s-2-ethyl-thio ethyl Phosphorodithioate {ethylthiometon}

(6) O-6-ethoxy-2-ethyl pyrimidine-IRU O and O-dimethyl Phosphorothioate {a etrimfos}

(7) 2, 3-dihydro - 2 and 2-dimethyl 7 - Benzofuranyl-N-dibutylamino thio-N-methyl KARUBO mate {carbosulfan}

(8) O and O-dimethyl O-(3, 5, 6-TORIKURORO-2-pyridyl) phosphorothioate {chlorpyrifos methyl}

(9) Isopropyl 4 and 4'-dichloro benzoate {chlorpropylate}

(10) Ethyl 4, a 4'-dichloro benzoate {chlorbenzilate}

(11) 2, 2, and 2-TORIKURORO -1, 1-bis(4-chlorophenyl) ethanol {Kelthane}

(12) 2-methoxy-4H-benzo- 1, 3, 2-dioxo phospho loin-2-SURUFAIDO {SARICHION}

(13) 1-(4-chlorophenyl)-3-(2, 6-difluoro benzoyl) urea {JIFURU bends chlorofluocarbon}

(14) 2-chloro-1-(2, 4-dichlorophenyl) vinyl Dimethyl phosphate {a run guard}

(15) O and O-dimethyl s-methylcarbomoylmethyl Phosphorodithioate {JIMETOTO}

- (16) O-ethyl O-4-methylthio phenyl s-propyl phosphorodithioate {sulprofos}
- (17) s-2-ethyl thio ethyl O,O-dimethylphosphorodithioate {thiometon}
- (18) 4-chlorophenyl - 2, 4, 5-TORIKURORO phenyl Sulfone {Tetradifon}
- (19) O and O-diethyl O-(3-oxo--2-phenyl-2H-pyridazine-6 IRU) phosphorothioate {pyridaphenthion}
- (20) O-2-diethylamino-6-methylpyrimidine-4-IRU O and O-dimethyl phosphorothioate {pirimiphos-methyl}
- (21) Isopropyl 4 and 4'-dibromo benzoate {phenisobromolate}
- (22) (RS)-alpha-cyano-3-(phenoxybenzyl S)-2-(4-difluoro-methoxyphenyl)-3-methyl butyrate {full SHITORINETO}
- (23) (RS)-alpha-cyano-3-(phenoxybenzyl R)-2-(4-chlorophenyl)-3-methyl butyrate {fenvalerate}
- (24) (S)-alpha-cyano-3-phenoxybenzyl (S)-2-(4-chlorophenyl)-3-methyl butyrate {esfenvalerate}
- (25) 2-t-butylamino-3-isopropyl-5-phenyl -3, 4 and 5, and 6-tetrahydro-2H- 1, 3, and 5-thiadiazin-4-one {buprofezin}
- (26) O-(2, 4-dichlorophenyl) O-ethyl s-propyl Phosphorodithioate {prothiophos}
- (27) 4-(methylthio) phenyl dipropyl phosphate {Propaphos}
- (28) O-4-BUROMO-2-chlorophenyl O-ethyl s-propyl Phosphorothioate {pro FENOSU}
- (29) Transformer-5-(4-chlorophenyl)-N-cyclohexyl-4-methyl-2-oxo--thiazolidine-3-carboxamide {HEKISHICHIAZOKUSU}
- (30) 3 - (phenoxybenzyl (IRS, 3RS;IRS, 3SR)-3-(2 and 2-dichloro vinyl)-2 and 2-dimethyl cyclopropane carboxylate {permethrin})
- (31) S, S 2-dimethylamino trimethylene dibenzene sulfonate {bensultap}
- (32) 6, 7, 8, 9, 10, and 10-hexa chloro - 1, 5a [5], 6, 9, and 9a-hexahydro -6, 9-methano - 2, 4, 3-benzodioxo thiepine-3-oxide {Thiodan}
- (33) The 3-chloro-alpha-ethoxy amino -2, 6-dimethoxybenzyl benzoate {a benzomate}
- (34) the 2 and 2-dimethyl -1 and 3-benzoIIOKI SOL-4-IRU a methyl carbamate {vondor -- Io -- KARUBU}
- (35) s-[1 and 2-bis(ethoxycarbonyl) ethyl] O,O-dimethylphosphorodithioate {marathon}
- (36) 2-sec-butylphenyl methyl carbamate {BPMC}
- (37) 2-(4-t-butylphenoxy) cyclohexyl prop-2-ynyl sulfonate {BPPS}
- (38) 1, 2-JIBURONO -2, 2-dichloro ethyl phosphate {BRP}
- (39) 4-chlorophenyl-4-chlorobenzene sulfonate {CPCBS}
- (40) 2-chloro-1-(2, 4, - dichlorophenyl) vinyl diethyl phosphate {CVP}
- (41) O-4-cyanophenyl O and O-dimethyl phosphoro CHIOTO {CYAP}
- (42) s-(2-methoxy-5-oxo-- 1, 3, 4-thia diazo phosphorus-4-ylmethyl) dimethyl phosphoro thio ROCHIONETO {DMTB}
- (43) O-2, 4-dichlorophenyl O, O diethyl phosphorothioate {ECP}
- (44) O-ethyl O-p-nitrophenyl Phenyl phosphono CHIOTO {EPN}
- (45) O and O-JIMERU O-(3-methyl-4-nitrophenyl) phosphorothioate {MEP}
- (46) 2-isopropyl phenyl Methylcarbamate {MIPC}
- (47) O and O-dimethyl O-4-methylthio-m-tolyl phosphoro CHIOTO {MPP}
- (48) 1-naphthyl methylcarbamate {NAC}
- (49) S-alpha-ethoxycarbonyl benzyl O,O-dimethylphosphorodithioate {PAP}
- (50) O and O-dimethyl s-phthalimidomethyl Phosphorodithioate {PMP}
- (51) 3, 5-xylol methylcarbamate {XMC}
- (52) 2(4-ethoxy phenyl)2-methylpropyl 3-phenoxy benzyl ether {etofenprox}
- (53) (RS)-alpha-cyano-3-(phenoxybenzyl RS)-2 and 2-dichloro-1-(4-ethoxy phenyl) cyclopropane carboxylate {cyclo pro TORUN}
- (54) 1-{3 and 5-dichloro-4-(3-chloro-5-trifluoromethyl-2-pyridyloxy) phenyl}-3-(2, 6-difluorobenzyl) urea {KURORU fluazuron}
- (55) (RS)-alpha-cyano-3-phenoxybenzyl N-(chloro - alpha, alpha, and alpha-trifluoro-p-tolyl)-D-valinate {fluvalinate}

- (56) O and O-dimethyl O-4-nitro-m-tolyl Phosphorothioate {fenitrothion}
- (57) O- (2 and 2-dichloro vinyl) O and O-dimethyl phosphate {dichlorvos}
- (58) O and O-dimethyl O- (3-methyl-4-methylthio phenyl) Phosphoro thio rhe {fenthion}
- (59) (RS)-alpha-cyano-3-phenoxybenzyl 2, 2, 3, and 3-tetramethyl cyclopropane carboxylate {Foehn proper thorin}
- (60) 3-phenoxybenzyl (1R) - cis- , transformer-chestnut SANTE mate {d-FENOSURIN}
- (61) (RS)-alpha-cyano-3-phenoxybenzyl (1R)-cis- , transformer-chestnut SANTE mate {cyphenothrin}
- (62) alpha-cyano-3-phenoxybenzyl (1R)-cis- , transformer-3-(2 and 2-dichloro vinyl)-2 and 2-dimethyl cyclopropane carboxylate {SHIPERUME thorin}
- (63) alpha-cyano-3-phenoxybenzyl (1R)-cis- , transformer-3-(2 and 2-dibromo vinyl)-2 and 2-dimethyl cyclopropane carboxylate {deltamethrin}
- (64) (S)-alpha-cyano-3-phenoxybenzyl (R [1], 1S)-cis- - 2 and 2-dimethyl-3-(1, 2, 2, and 2-tetrabromo ethyl) cyclopropane carboxylate {tralomethrin}
- (65) 3, 4, 5, a 6-tetrahydro phthalimidomethyl (1RS)-cis- , transformer-chestnut SANTE mate {tetra-scalpel phosphorus}
- (66) 3, 4, 5, a 6-tetrahydro phthalimidomethyl (1R)-cis- , transformer-chestnut SANTE mate {d-tetra-scalpel phosphorus}
- (67) (RS)-3-allyl compound-2-methyl-4-oxy-clo vent-2-ENIRU (1RS)-cis- , transformer-chestnut SANTE mate {allethrin}
- (68) (RS)-3-allyl compound-2-methyl-4-oxy-clo vent-2-ENIRU (1R)-cis- , transformer-chestnut SANTE mate {d-allethrin}
- (69) (S)-2-methyl-4-oxo--3-(2-pro vinyl) cyclopent-2-ENIRU (1R)-cis- , transformer-chestnut SANTE mate {PURARESU phosphorus}
- (70) (R3)-1-ethynyl-2-methyl-2-pentenyl -(1R)- Cis- , transformer-chestnut SANTE mate {en penny phosphorus}
- (71) 5-benzyl-3-furil methyl (1RS) - cis- , transformer-chestnut SANTE mate {loess scalpel phosphorus}
- (72) 5-benzyl-3-furil methyl (1R) - cis- , transformer-chestnut SANTE mate {d-loess scalpel phosphorus}
- (73) alpha-cyano-3-phenoxybenzyl (1R, transformer) -2, 2-dimethyl-3-(2-chloro-2-trifluoro methylvinyl) cyclopropane carboxylate {SHIHARO thorin}
- (74) alpha-cyano-4-fluoro-3-phenoxybenzyl -(1R, transformer) 2, 2-dimethyl-3-(2 and 2-dichloro vinyl) cyclopropane carboxylate {SAIFURUSURIN}
- (75) alpha-cyano-3-phenoxybenzyl 2 -(4-difluoro methoxypheny)- Iso valerate {full SAISURINETO}
- (76) 2-methyl-3-phenyl benzyl (1R, transformer)-2, and 2-dimethyl-3-(2-chloro-2-trifluoro methylvinyl) cyclopropane carboxylate {bifenthrin})
- (77) 2, 2, 3, 5, 6-tetrafluoro-4-methylbenzyl (1R, transformer) -2 and 2-dimethyl-3-(2-chloro-2 trifluoro methylvinyl) cyclopropane carboxylate {tefluthrin}
- (78) 4-(phenoxyphenyl RS)-2-(2-pyridyloxy) propyl ether {pyriproxifen}
- (79) Isopropyl (E, E)-(RS)-11-methoxy - 3, 7, 11-trimethyldodeca 2, 4-dienoate {meso PUREN}
- (80) Ethyl {2-(4-phenoxyphenoxy) ethyl} carver mate {a phenoxy curve}
- (81) Ethyl 3 and 7, 11-trimethyldodeca -2, 4-dienoate {hydroprene}
- (82) N-4-chlorophenyl - N' - 2, 6-JIFUROORO benzoyl urea {JIFURUBENZURON}
- (83) N-3, 5-dichloro -2, 4-difluoro phenyl - N' - 2, 6-difluoro benzoyl urea {teflubenzuron}
- (84) N-4-trifluoro methoxypheny - N' - 2, 6-difluoro benzoyl urea {triflururon}
- (85) N-2-fluoro-4-(2-chloro-4-trifluoro phenoxy oxy-) phenyl - N' - 2 and 6-difluoro benzoyl urea {full FENOKUSURON} etc. is raised.
- [0011] As a germicide, they are (86) diisopropyls. 1, 3-dithiolane-2-ylidene malonate {isoprothiolane}
- (87) The 3-(3, 5-dichlorophenyl)-N-isopropyl -2, 4-dioxo imidazolidine-1-carboxamide {iprodione}
- (88) 5-ethoxy-3(trichloromethyl)- 1, 2, and 4-thiadiazole {echlomezole}
- (89) 1, 2, 3, a 6-tetrahydro-N-(trichloromethyl thio) phthalimide {captan})

- (90) 1, 4-dichloro -2, 5-dimethoxybenzene {chloroneb}
- (91) N-dichloro fluoro methylthio-N'-N'-dimethyl-N-phenyl sulfamide {dichlofluamid}
- (92) Tetramethyl JISURUFAIDO {thiuram}
- (93) Dimethyl 4, a 4'-(O-phenylene) screw (3-thio allophanate) {thiophanate-methyl}
- (94) 1-(4-chloro phenoxy)-3 and 3-dimethyl-1-(1H- 1, 2, 4-triazole-1-yl) butanone {thoria JIMEHON}
- (95) 2, 4-dichloro -6 -(2-chloroanilino)- 1,3,5-triazine {triazine}
- (96) (RS)-N-(1-butoxy - 2, 2, and 2-trichloroethyl) salicylamide {trichlamid}
- (97) O-(2, 6-dichloro-4-methylphenyl) O and O-dimethyl Phosphorothioate {trichloroethyl methyl}
- (98) (E)-4-chloro - alpha, alpha, alpha-trifluoro-N-(1-imidazole-1-IRU-2-propoxy ethyl IDEN)-O-torr IDEN {triflumizole}
- (99) 1-(biphenyl -4 yloxy)-3, 3-dimethyl-1-(1, 2, 4-triazole-1-yl) butane-2-Orr {BAIKORARU}
- (100) 5-methyl isoxazole-3-Orr (hydroxyisoxazole)
- (101) 2-sec-butyl -4, 6-dinitrophenyl 3-methyl crotonate {binapacryl}
- (102) Phenazine-5-oxide (phenazine oxide)
- (103) 4, 5, 6-tetra-chloro free-wheel-plate RUIDO {fthalide}
- (104) N-(p-fluoro phenyl) 2, 3-dichloro maleimide {Fluor imide}
- (105) alpha, alpha, and alpha-trifluoro-O-torr anilide {flutolanil}
- (106) N-(3, 5-dichlorophenyl)-1, 2-dimethyl cyclopropane -1, a 2-dicarboxy amide {procymidone}
- (107) 3-allyloxy -1, the 2-BENJISO-thiazole -1, 2-dioxide {Probenazole}
- (108) Methyl 1-(butylcarbonyl) benzimidazole-2-IRUKABA mate (BENOMIRU)
- (109) 1-(4-chloro benzyl)-1-cyclopentyl-3-phenyl urea {BENSHI kuron}
- (110) N-methyl N-(p-methylsulfonyl oxy-phenyl) thio carboxamide {metasulfocarb}
- (111) 3'-isopropoxy-2-methyl benzanilide {MEPURONI t RU}
- (112) 2,6-dichloro-4-nitroaniline {CNA}
- (113) O-ethyl S'S-dimethyl phosphorodithioate {EDDP}
- (114) Pentachloronitrobenzene {PCNB}
- (115) TETORAKUROROISO-phthalonitrile {TPN}
- (116) (E)-1-(2, 4-dichlorophenyl)-4 and 4-dimethyl -2 -(1, 2, 4-triazole-1-yl)- 1-pentene-3-oar {diniconazol}
- (117) O-2, 6-dichloro-4-methylphenyl - O and O-dimethyl phosphorothioate {tolclofos-methyl}
- (118) N-propyl-N-{2-(2, 4, 6-trichlorophenoxy) ethyl} imidazole-1-carboxamide {pro KURORAZU}
- (119) (**)-2, 4'-dichloro-alpha-(pyrimidine-5-IRU) benzhydryl alcohol {fenarimol}
- (120) An N-{3-(1-methylethoxy) phenyl}-2-(trifluoromethyl) benzamide {hula truck nil} etc. is mentioned.
- ✓ [0012] As a herbicide and/or a plant growth regulator, it is 2(121)-methyl-4-chloro phenoxy ethyl butylate {MCPB-E}.
- ✓ (122) 2-chloro - 2', 6'-diethyl-N-(2-propoxy ethyl) acetanilide {pretilachlor}
- (123) alpha-(2-naphthoxy) propione anilide {naproanilide}
- (124) The 2-methylthio -4, 6-bis(ethylamino)-S-triazine {simetryn}
- (125) S-tertiary butyl-3-(2, 4-dichloro-5-isopropoxy phenyl)- 1, 3, and 4-OKISA diazo phosphorus-2-ON {oxadiazon}
- (126) S-2-methyl-piperidyl-carbonylmethyl - O and O-G n-propyl dithiophosphate {PIPEROHOSU}
- (127) 3-isopropyl - 2, 1, 3-benzoCHIAJI anone-(4)-2, and 2-dioxide {bentazone}
- (128) 2-methylthio-4-ethylamino-6-(1, 2-dimethyl propylamino)-S-triazine (dimethametryn)
- (129) 3-(4, 6-dimethoxy pyrimidine-2-IRU)-1-[(2-methoxy phenyl isocyanate benzyl) sulfonyl] urea {bensulfuron-methyl}
- (130) 2-chloro -2, 6-diethyl-N-(methoxymethyl) aceto ANICHIDO {alachlor}
- (131) S-2-methyl piperidino carbonylmethyl - O and O-dipropyl FOSUFOROJICHIOETO {PIPEROHOSU}
- (132) 4-(2, 4-dichlorobenzoyl)-1, 3-dimethyl-5-PIRAZOIRU-P-toluenesulfonate (pyrazolate)
- (133) N-(butoxy methyl)-2-chloro-2-6-diethyl acetanilide {butachlor}

- (134) S-4-chloro benzyl diethyl thiocarbamate {benthicarb} (135) 2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide {Metra Corp crawl}
 (136) S-ethyl-N and N-hexamethylene thiocarbamate {a molinate}
 (137) 1-(alpha and alpha-dimethylbenzyl)-3-P-Trier urea {dymron}
 (138) 2-chloro-N-(3-methoxy-2-thenyl)-2, 6-dimethyl acetanilide {the TERIRU crawl}
 (139) 1-(2-chloro [1 and 2-imidazo a] pyridine-3-iso sulfonyl)-3-(4, 6-dimethoxy pyrimidine-2-IRU) urea {imazosulfuron}
 (140) Ethyl =5-(4, 6-dimethoxy pyrimidine-2-IRUKARUBA moi sulfamoyl)-1-methyl pyrazole-4-carboxylate {PIRAZOSU Le FROMT ethyl}
 (141) 1-(4, 6-dimethoxy pyrimidine-2-IRU)-3-(3-trifluoromethyl-2-pyridyl sulfonyl) urea {hula ZASURU chlorofluocarboxyl}
 (142) Methyl =3-(4-methoxy-6-methyl-1,3,5-triazine-2-IRUKARUBA moi sulfamoyl)-2-thenoate {CHIFENSU Le FROMT methyl}
 (143) methyl =2- [3-(4-methoxy-6-methyl-1,3,5-triazine-2-IRU) ureido sulfonyl] -- benzoate {methosulfuronmethyl} (144) n-butyl-(R)-2-[4-(4-cyano-2-fluorophenoxy) phenoxy] propionate {SHIHARO hop butyl}
 (145) 2-benzothiazole-2-yloxy-N-methyl acetanilide {a MEFENA set}
 (146) 5-(2, 4-dichloro phenoxy)-2-nitro anisole {chlormethoxynil}
 (147) 1-(2-chlorophenyl sulfonyl)-3-(4-methoxy-6-methyl-1,3,5-triazine-2-IRU) urea {KURORU sulfone}
 (148) 3-(4-isopropenyl pull phenyl)-1 and 1-dimethylurea {isoproturon}
 (149) 4-amino-5-tert-butyl-3-methylthio - 1, 2, 4-triazine -5 (4H) ON {METORIPUJIN}
 (150) 2, 6-dinitro-N, and N-dipropyl-4-trifluoro methylaniline {trifluralin}
 (151) 6-chloro-N-ethyl-N'-isopropyl-1,3,5-triazine diyl -2, 4-diamine {Atrazine}
 (152) 2-chloro -4, 6-bis(ethylamino)-1,3,5-triazine {simazine}
 (153) 3(3, 4-dichlorophenyl)-1-methoxy-1-methyl urea {linuron} etc. is mentioned. Two or more kinds may be mixed and you may make into a microcapsule agent whether to be independent in this pest control agent. the content of this pest control agent to the whole system at the time of microencapsulating this pest control agent -- the potency of this pest control agent -- physical and chemical -- although it changes also with descriptions, 1 - 40% (weight % is expressed hereafter) extent is desirable.

[0013] Although when this pest control agent is an oil-like may use it as it is since this pest control agent makes it into a detailed particulate material underwater in case it microencapsulates, it is made the oily liquid which used or warms a solvent beforehand if needed, and is easy to make a particulate material. As a solvent to be used, the thing of difficulty water solubility or nonaqueous solubility is good, for example, mineral oil, such as organic chlorine, such as ether, such as butyl ether and ethyl vinyl ether, dichloromethane, and trichloroethane, and machine oil, vegetable oil, phthalic ester, adipate, phosphoric ester, maleates, a low-molecular epoxy compound, etc. are mentioned.

- ✓[0014] A role with a dispersant important in order to perform control and efficient capsulation of a particulate material by these microencapsulation is played. for example, an acrylic-acid polymerization object and an acrylic-acid (meta) copolymerization object (acrylic ester, such as a methyl acrylate, --) A copolymerization object with an acrylic-acid amide, acrylonitrile, a styrene sulfonic acid, vinyl acetate, etc.), a maleic-acid copolymerization object (styrene, ethylene, a propylene, and the methyl vinyl ether --) Vinyl acetate, a copolymerization object with an isobutylene, a carboxymethyl cellulose, Polymeric materials, such as polyvinyl alcohol, xanthan gum, gum arabic, Natural polysaccharide, such as sodium alginate, and polyoxyethylene alkyl aryl ether Polyoxyethylene alkyl ether and polyoxyethylene alkyl ester A polyoxyethylene alkylphenyl condensate, polyoxyethylene alkylamino ether, Polyoxyethylene alkylamide and polyoxyethylene polyoxypropylene blockpolymers Polyoxyethylene sorbitan fatty acid ester and sorbitan fatty acid esters It is used combining that surfactants, such as an alkyl naphthalene sulfonic-acid formaldehyde condensate, etc. are independent or two sorts or more, and is usually used 0.1 - 5% of preferably 0.1 to 10% to the whole dispersed system. The dispersant of the specified

quantity is dissolved in the water which is a continuous phase as operation, it carries out whether it agitates, after adding the heart matter of difficulty water solubility or nonaqueous solubility to this or adding, agitating, and a dispersed system is produced. However, a meltable dispersant can also be beforehand used for the heart matter to the heart matter, dissolving it. In addition, after manufacturing a microcapsule, these dispersants can be used, also in order to stabilize a dispersed system so that a capsule may not sediment.

✓ [0015] As aromatic series isocyanate, 2, 4-toluene diisocyanate, 2,6-toluene diisocyanate, methylenebis-(4-phenyl isocyanate), polymethylene polyphenyl polyisocyanate, etc. are mentioned, and, as for the multiple-valued isocyanate used by this invention, tetramethylene di-isocyanate, pentamethylene diisocyanate, hexamethylene di-isocyanate, trimethyl hexamethylene di-isocyanate, isophorone diisocyanate, etc. are mentioned as non-aromatic isocyanate. moreover -- although the ratio of aromatic series isocyanate is 5 - 80% among the multiple-valued isocyanates used -- aromatic series isocyanate -- independent -- or two or more kinds may be used and non-aromatic isocyanate is independent similarly - or two or more kinds may be used.

✓ [0016] it is tetramethylenediamine, pentamethylene diamine, hexamethylenediamine, ethylenediamine, propylene -1, 3-diamine, diethylenetriamine, TORIECHIREN triamine, TERORA ethylene pentamine, 1, 3-phenylenediamine, 2, and 4-toluylene diamine etc., and independent [in these polyfunctional amine] about a polyfunctional amine, -- or two or more kinds may be used.

[0017] an interface pile -- the process which the process of microencapsulation depended lawfully makes (1) heart matter suspend underwater by the particle, and produces a dispersed system, and (2), although divided into two steps of the polymerization reaction process which film material is made to react on the front face of the particulate material, and produces the microcapsule by the resin film Since the particle diameter of a microcapsule is mostly determined at the process of the dispersed system of (1), it is important for it to choose the dispersant set by the design of a capsule particle at this process and the churning approaches (an agitator kind, churning speed, etc.).

[0018] Moreover, other adjuvants, for example, the stabilizing agent of this active substance etc., can also be made to connote if needed. The manufactured microcapsule usually adds the thickener for stabilizing a dispersed system. As a thickener, mineral powder, such as natural polysaccharide, such as xanthan gum (ZANTANGAMU) and a locust beam, magnesium aluminium silicate, and a bentonite, etc. can mix and use synthetic macromolecules, such as semisynthesis polysaccharide, such as a carboxymethyl cellulose, and polyacrylic acid, by independent or two sorts or more, for example. Furthermore, synergists, such as stabilizing agents, such as antifreezing agents, such as propylene glycol and ethylene glycol, and BHT, and piperonyl butoxide, an antifungal agent, a coloring agent, an aromatic, etc. are added if needed, and it considers as the letter pharmaceutical preparation of underwater suspension.

✓ [0019] The mean particle diameter of the microcapsule of this invention can be suitably chosen according to the description of a pest control agent, and is usually 5-40 micrometers preferably 3-50 micrometers.

[0020]

[Example] An example explains this invention below (the section expresses the weight section hereafter).

[0021] The polymethylene-polyphenyl-polyisocyanate 3.2 section and the isophorone diisocyanate 12.6 section were added to the example 12-methyl-4-chloro phenoxy ethyl-butylate (MCPB-E) 300 section as film material, the mixed dissolution was carried out at homogeneity, and oil was prepared. The 2% water-solution 521 of Gosenol AL-06 (Japanese synthetic chemistry company make) section was put into other containers, it warmed at 30 degrees C, and dispersion liquid were prepared. Oil and dispersion liquid were put into the container of 1L, it distributed for 5 minutes by engine-speed 8000rpm using the mixing analyzer 2500 mold (special opportunity-ized industrial company make), and the emulsion of an O/W mold was prepared. Added 20% each of mixed water-solution 13.2 section of ethylenediamine and diethylenetriamine to this, it made to react at 60 degrees C for 3 hours, and the microcapsule liquid of the poly urea film was prepared. Furthermore, the 50% water-solution 100 of propylene glycol

section and the 2% water-solution 50 section of xanthan gum were added, it mixed to homogeneity, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 20%. The measured value of mean particle diameter was 13.5 micrometers.

[0022] The polymethylene polyphenyl polyisocyanate of example 2 example 1 was changed into the 7.1 sections, isophorone diisocyanate was changed into the 8.7 sections, other raw-material charges and manufacture actuation were performed like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 45%. The measured value of mean particle diameter was 13.9 micrometers.

[0023] The polymethylene polyphenyl polyisocyanate of example 3 example 1 was changed into the 11.1 sections, isophorone diisocyanate was changed into the 4.7 sections, other raw-material charges and manufacture actuation were performed like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 70%. The measured value of mean particle diameter was 14.4 micrometers.

[0024] the polymethylene polyphenyl polyisocyanate of example 4 example 1 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 42.3 sections, 20% each of mixed water solution of the 453 sections and ethylenediamine, and diethylenetriamine was changed into the 44.1 sections, other raw-material charges and manufacture actuation performed isophorone diisocyanate in the 10.6 sections like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the multiple-valued ISOSHIANE matter in the oil of this agent is 15%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 20%. The measured value of mean particle diameter was 14.2 micrometers.

[0025] the polymethylene polyphenyl polyisocyanate of example 5 example 1 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 22.5 sections, 20% each of mixed water solution of the 478 sections and ethylenediamine, and diethylenetriamine was changed into the 34.1 sections, other raw-material charges and manufacture actuation performed isophorone diisocyanate in the 18.4 sections like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 12%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 45%. The measured value of mean particle diameter was 14.8 micrometers.

[0026] the polymethylene polyphenyl polyisocyanate of example 6 example 1 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 7.8 sections, 20% each of mixed water solution of the 502.1 sections and ethylenediamine, and diethylenetriamine was changed into the 21.8 sections, other raw-material charges and manufacture actuation performed isophorone diisocyanate in the 18.3 sections like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 8%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 70%. The measured value of mean particle diameter was 14.7 micrometers.

[0027] example 70-(3, 5, 6-TORIKURORO-2-pyridyl) O and O-diethyl the high ZORU #150 (Nippon Oil Co., Ltd. make) 50 section was added to the phosphorothioate (chlorpyrifos) 250 section as a solvent, and it heated at 45 degrees C, and considered as the uniform solution -- further, the polymethylene-polyphenyl-polyisocyanate 3.2 section and the hexamethylene di-isocyanate 12.6 section were added as film material, the mixed dissolution was carried out at homogeneity, and oil was prepared. The 2% water-solution 521 of Gosenol AL-06 (Japanese synthetic chemistry company make) section was put into other containers, it warmed at 30 degrees C, and dispersion liquid were prepared. Oil and dispersion liquid were put into the container of 1L, it distributed for 5 minutes by engine-speed 9000rpm using the mixing analyzer 2500 mold (special opportunity-ized industrial company make), and

the emulsion of an O/W mold was prepared. Added 20% each of mixed water-solution 13.2 section of ethylenediamine and diethylenetriamine to this, it was made to react at 60 degrees C for 3 hours, and the microcapsule liquid of the poly urea film was prepared. Furthermore, the 50% water-solution 100 of propylene glycol section and the 2% water-solution 50 section of xanthan gum were added, it mixed to homogeneity, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 20%. The measured value of mean particle diameter was 10.2 micrometers.

[0028] The polymethylene polyphenyl polyisocyanate of example 8 example 7 was changed into the 7.1 sections, hexamethylene di-isocyanate was changed into the 8.7 sections, other raw-material charges and manufacture actuation were performed like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 45%. The measured value of mean particle diameter was 10.5 micrometers.

[0029] The polymethylene polyphenyl polyisocyanate of example 9 example 7 was changed into the 11.1 sections, hexamethylene di-isocyanate was changed into the 4.7 sections, other raw-material charges and manufacture actuation were performed like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 70%. The measured value of mean particle diameter was 10.9 micrometers.

[0030] the polymethylene polyphenyl polyisocyanate of example 10 example 7 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 42.3 sections, 20% each of mixed water solution of the 453 sections and ethylenediamine, and diethylenetriamine was changed into the 44.1 sections, other raw-material charges and manufacture actuation performed hexamethylene di-isocyanate in the 10.6 sections like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 15%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 20%. The measured value of mean particle diameter was 11.3 micrometers.

[0031] the polymethylene polyphenyl polyisocyanate of example 11 example 7 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 22.5 sections, 20% each of mixed water solution of the 478 sections and ethylenediamine, and diethylenetriamine was changed into the 34.1 sections, other raw-material charges and manufacture actuation performed hexamethylene di-isocyanate in the 18.4 sections like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 12%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 45%. The measured value of mean particle diameter was 11.6 micrometers.

[0032] the polymethylene polyphenyl polyisocyanate of example 12 example 7 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 7.8 sections, 20% each of mixed water solution of the 502.1 sections and ethylenediamine, and diethylenetriamine was changed into the 21.8 sections, other raw-material charges and manufacture actuation performed hexamethylene di-isocyanate in the 18.3 sections like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 8%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 70%. The measured value of mean particle diameter was 11.5 micrometers.

[0033] The polymethylene polyphenyl polyisocyanate of example of comparison 1 example 1 was changed into the 0.16 sections, isophorone diisocyanate was changed into the 15.64 sections, other raw-material charges and manufacture actuation were performed like the example 1, and the microcapsule

pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 1%. The measured value of mean particle diameter was 13.9 micrometers. [0034] the polymethylene polyphenyl polyisocyanate of example of comparison 2 example 1 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 1.3 sections, 20% each of mixed water solution of the 502.1 sections and ethylenediamine, and diethylenetriamine was changed into the 21.8 sections, other raw-material charges and manufacture actuation performed isophorone diisocyanate in the 24.8 sections like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the multiple-valued ISOSHIANE matter in the oil of this agent is 8%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 95%. The measured value of mean particle diameter was 14.8 micrometers.

[0035] The polymethylene polyphenyl polyisocyanate of example of comparison 3 example 7 was changed into the 0.16 sections, hexamethylene di-isocyanate was changed into the 15.64 sections, other raw-material charges and manufacture actuation were performed like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 1%. The measured value of mean particle diameter was 10.1 micrometers.

[0036] the polymethylene polyphenyl polyisocyanate of example of comparison 4 example 7 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 1.3 sections, 20% each of mixed water solution of the 502.1 sections and ethylenediamine, and diethylenetriamine was changed into the 21.8 sections, other raw-material charges and manufacture actuation performed hexamethylene di-isocyanate in the 24.8 sections like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 8%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 95%. The measured value of mean particle diameter was 11.9 micrometers.

[0037] example of trial 1; -- phytotoxicity test sample offering drugs; to paddy rice -- 3 / pot transplantation of the paddy rice of examples 1-6, the example 1 of a comparison - 2 test-method; form AKINISHIKI, and leaf age 2-3L are carried out. 40g / 10a processing of drugs are done by the active principle five days after transplantation. Search procedure; weighing capacity of the live weight of a leave and stem is carried out one month after drugs processing, and the processing ratio for nothing (%) is computed (average of 3 ream system).

A test result is shown in a table 1.

[0038]

[A table 1]

Table 1 ----- sample offering drugs Multiple valued in oil Multiple-valued isocyanate Live weight Isocyanate ratio Inner aromatic series ISOSHIA Processing ratio for nothing Rate (y) NETO ratio (x)

An example 1 5% 20% The 90% example 2 5% 45% The 92% example 3 5% 70% 93% example 4 15% 20% 96% example 5 12% 45% The 96% example 6 8% 70% 98% ----- The example 1 of a comparison 5% 1% 28% of examples of 35% comparison -- 95% 98% ----- although phytotoxicity was clearly seen in the example 1 of a comparison as mentioned above, and some growth control was seen in the example and the example 2 of a comparison, it was satisfactory practically.

[0039] example of trial 2; -- weeding-out validity test sample offering drugs [of Monochoria vaginalis]; -- examples 1-6 and example of comparison 1-2 test-method; 600cm² Paddy soil is put into a vat and seeding of Monochoria vaginalis is carried out. 20g / 10a processing of drugs are done by the active principle five days after seeding.

Search procedure; the number of Monochoria vaginalis which budded after [of an after / drugs processing] two weeks and after four weeks is investigated (average of 3 ream system). In addition, all Monochoria vaginalis investigated after two weeks is removed.

A test result is shown in a table 2.

[0040]

[A table 2]

Table 2 ----- sample offering drugs Multiple valued in oil Multiple-valued isocyanate Number of Monochoria vaginalis Isocyanate ratio Inner aromatic series ISOSHIA After two weeks and four weeks Rate (y) NETO ratio (x)

An example 1 5% 20% 1 Zero example 2 5% 45% 1 Two examples 3 5% 70% 2 One example 4 15%

20% 5 Five examples 5 12% 45% 8 Six examples 6 8% 70% 13 10 -----

Example 1 of a comparison 5% 1% Example 2 of 135 comparisons 8% 95% 7043 -----

----- Processing [no]. - - 136 93----- in the example 1 of a comparison, although the example showed good validity as mentioned above, although examination two weeks after showed good validity, after four weeks, validity was inferior and the problem was in residual effectiveness. It seemed that moreover, validity was inferior by examination of the both sides of two weeks and four weeks after, bleedoff of the active ingredient to the outside of the capsule film was controlled, and it was not effectively used in the example 2 of a comparison.

[0041] example of trial 2; -- insecticidal potential test sample offering drugs [of a termite]; -- the 300 time water diluent (0.1% of active ingredients) of the sample offering drugs which put 300g of upland soil into an arrogant petri dish with an examples [7-12] and an example of comparison 3-4 test-method; diameter of 10cm, and make a soil front face common is processed to homogeneity on 24ml (3 L/m2 considerable) soil front face. Six months one day after after [processing] room temperature preservation, and after [of thermostat preservation] 40 degrees C, the insects scatter of 20 worker ants and one soldier ant of a termite is carried out to a soil front face.

Search procedure; the number of dead insects of the worker ant 24 hours after a termite insects scatter is investigated (average of 3 ream system), and mortality is computed. In addition, about a soldier ant, it considers as the outside of the object of examination.

Test-result; is shown in a table 3.

[0042]

[A table 3]

Table 3 ----- sample offering drugs Multiple valued in oil Multiple-valued isocyanate Mortality Isocyanate ratio Inner aromatic series ISOSHIA One day and six months after Rate (y) NETO ratio (x)

An example 7 5% 20% 100 95 examples 8 5% 45% 100 100 examples 9 5% 70% 100 100 examples 10

15% 20% 100 100 examples 11 12% 45% 100 100 examples 12 8% 70% 90 100 -----

----- The example 3 of a comparison 5% 1% 100 The example 4 of 45 comparisons 8% 95% 7075 -----

----- Processing [no]. - - 0 0----- in the example 3 of a comparison, although the example showed good validity as mentioned above, although examination one day after showed good validity, after six months, validity was inferior and the problem was in residual effectiveness. It seemed that moreover, validity was inferior by examination of the both sides of one day and six months after, bleedoff of the active ingredient to the outside of the capsule film was controlled, and it was not effectively used in the example 4 of a comparison.

[0043]

[Effect of the Invention] Since the pest control microcapsule constituent of this invention controlled bleedoff out of the microcapsule film of an active ingredient, the activity became possible also to the crop which was not able to be used by the phytotoxicity over an object crop etc., and the activity became possible also at the processing stage which was not able to be similarly used by phytotoxicity etc. Moreover, residual effectiveness grant is attained also to the drugs which whose shelf-life was short and needed several processings, and it is useful.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the microencapsulated constituent by which it comes to control the bleedoff rate of a pest control active ingredient.

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PRIOR ART

[Description of the Prior Art] Various the approaches of microencapsulating a pest control agent until now and controlling bleedoff of an active ingredient are proposed. For example, a ligninsulfonic acid salt is used as an emulsifier. The manufacture approach of a microcapsule of making it reacting with a polyfunctional amine as multiple-valued isocyanate using polymethylene polyphenyl isocyanate, and making a water-immiscible herbicide connoting in the poly urea film (JP,63-32761,B), The mixture constituent of the microcapsule which enclosed N-chloro acetyl cyclohexene amine which has a herbicidal action in the capsule film of poly urea (JP,63-230606,A), An approach, an agricultural-chemicals constituent (JP,7-165505,A), etc. which add the polyethylene oxide of mean molecular weights 150-8 million and/or the polypropylene glycol of mean molecular weights 134-300 in the coat of a microcapsule, and carry out bleedoff control are mentioned.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since the pest control microcapsule constituent of this invention controlled bleedoff out of the microcapsule film of an active ingredient, the activity became possible also to the crop which was not able to be used by the phytotoxicity over an object crop etc., and the activity became possible also at the processing stage which was not able to be similarly used by phytotoxicity etc. Moreover, residual effectiveness grant is attained also to the drugs which whose shelf-life was short and needed several processings, and it is useful.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Although bleedoff out of the microcapsule film of an active ingredient was generally controlled and the pest control agent constituent which microencapsulated was excellent in residual effectiveness, initial validity is imperfection in many cases, and the case where an active ingredient remained in a capsule and it could not use effectively had it. Since the pest control agent microcapsule constituent of this invention can control bleedoff out of the microcapsule film of an active ingredient, initial validity and residual effectiveness are excellent.

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MEANS

[Means for Solving the Problem] A poly urea film microcapsule is made to connote this invention by interfacial polymerization by multiple-valued isocyanate and the polyfunctional amine by using as the heart matter this pest control agent made to dissolve in the pest control agent and/or difficulty water soluble solvent whose solubility to 20-degree C water is 1% or less, these multiple-valued isocyanates are aromatic series isocyanate and non-aromatic isocyanate, and aromatic series isocyanate is 5 - 80 % of the weight to the whole quantity of multiple-valued isocyanate. Furthermore, in the ratio y of the multiple-valued isocyanate to the heart matter, and the relation of the ratio x to the multiple-valued isocyanate whole quantity of aromatic series isocyanate, it is preferably related with the pest control microcapsule constituent by which the bleedoff rate to the outside of the film of the pest control active ingredient in the microcapsule with which the ratio of the multiple-valued isocyanate to the heart matter is characterized by being the ratio (% of the weight) of the following formula -1 and a formula -2 within the limits was controlled, and is {0005}.

[Equation 3]

$$y = -0.015x + 2.0 \text{ (formula -1)}$$

{0006}

[Equation 4]

$y = -0.13x + 20.0$ (formula -2) Although it excels in quick action when there are few ratios of the multiple-valued isocyanate to the heart matter than a formula -1, residual effectiveness may be inferior or phytotoxicity may arise. Moreover, when [than a formula -2] more, bleedoff of the active ingredient to the outside of the capsule film is controlled, and an initial effect may be unable to be inadequate, or an active ingredient may remain in a capsule and it may be unable to use effectively.

{0007}

[Embodiment of the Invention] This invention is explained below at a detail. Although the pest control agent of this invention may be mixed with a difficulty water soluble solvent as long as the microencapsulation approach has a liquefied pest control agent, the mixed dissolution of the multiple-valued isocyanate is carried out what could use even if it remained as it is, and was dissolved in the difficulty water soluble solvent when it was a solid-state (it is described as the heart matter below). A polyfunctional amine is made to be able to add, making it distribute in the water solution which dissolved the dispersant, and agitating these oil, and the capsule film of poly urea can be made to form in a particulate material front face. If the water solubility of this pest control agent is high in that case, formation of the capsule film on the front face of a particle becomes a defect, and a good microcapsule cannot be manufactured.

{0008} The multiple-valued isocyanates used by this invention are aromatic series isocyanate and non-aromatic isocyanate, and aromatic series isocyanate is 5 - 80 % of the weight to the whole quantity of multiple-valued isocyanate. Although aromatic series isocyanate is excellent in quick action among the multiple-valued isocyanates used here with the amount used smaller than 5%, residual effectiveness may be inferior or phytotoxicity may arise. Conversely, from 80%, by many amount used, bleedoff of the active ingredient to the outside of the capsule film is controlled, and an initial effect may be unable to be

inadequate, or an active ingredient may remain in a capsule and it may be unable to use effectively. [0009] Furthermore, in the relation between the ratio y of the multiple-valued isocyanate to the heart matter, and the ratio x to the multiple-valued isocyanate whole quantity of aromatic series isocyanate, the pest control microcapsule constituent by which the bleedoff rate to the outside of the film of the pest control active ingredient in a microcapsule was controlled when the ratio of the multiple-valued isocyanate to the heart matter made it the ratio (% of the weight) of a formula -1 and a formula -2 within the limits like drawing 1 can be obtained preferably.

[0010] The pest control agent applied to this invention For example, an insecticide, miticide, It has the property which are a germicide, a herbicide, a plant growth regulator, an insect pheromone, etc., dissolves in the oily liquid or difficulty water soluble solvent of nonaqueous solubility or difficulty water solubility which is 1% or less of solubility to 20-degree C water, and becomes a liquid. Specifically, it is (1) O-(3, 5, 6-TORIKURORO-2-pyridyl) O and O-diethyl as an insecticide and/or miticide. Phosphorothioate {chlorpyrifos}

- (2) O and O-dimethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate {diazinon}
- (3) O and O-diethyl O-5-phenyl isoxazole-3 IRU-phosphorothioate {isoxathion}
- (4) O-ethyl O-2-isopropoxy-carbonylphenyl Isopropyl phosphoramido thioate {isofenphos}
- (5) O and O-diethyl-s-2-ethyl-thio ethyl Phosphorodithioate {ethylthiometon}
- (6) O-6-ethoxy-2-ethyl pyrimidine-IRU O and O-dimethyl Phosphorothioate {an etrimfos}
- (7) 2, 3-dihydro - 2 and 2-dimethyl 7 - Benzofuranyl-N-dibutylamino thio-N-methyl KARUBO mate {carbosulfan}
- (8) O and O-dimethyl O-(3, 5, 6-TORIKURORO-2-pyridyl) phosphorothioate {chlorpyrifos methyl}
- (9) Isopropyl 4 and 4'-dichloro benzoate {chloropropylate}
- (10) Ethyl 4, a 4'-dichloro benzoate {chlorbenzilate}
- (11) 2, 2, and 2-TORIKURORO -1, 1-bis(4-chlorophenyl) ethanol {Kelthane}
- (12) 2-methoxy-4H-benzo- 1, 3, 2-dioxo phospho loin-2-SURUFAIDO {SARICHION}
- (13) 1-(4-chlorophenyl)-3-(2, 6-difluoro benzoyl) urea {JIFURU bends chlorofluocarbon}
- (14) 2-chloro-1-(2, 4-dichlorophenyl) vinyl Dimethyl phosphate {a run guard}
- (15) O and O-dimethyl s-methylcarbamoylmethyl Phosphorodithioate {JIMETOTO}
- (16) O-ethyl O-4-methylthio phenyl s-propyl phosphorodithioate {sulprofos}
- (17) s-2-ethyl thio ethyl O,O-dimethylphosphorodithioate {thiometon}
- (18) 4-chlorophenyl - 2, 4, 5-TORIKURORO phenyl Sulfone {Tetradifon}
- (19) O and O-diethyl O-(3-oxo--2-phenyl-2H-pyridazine-6 IRU) phosphorothioate {pyridaphenthion}
- (20) O-2-diethylamino-6-methylpyrimidine-4-IRU O and O-dimethyl phosphorothioate {pirimiphos-methyl}
- (21) Isopropyl 4 and 4'-dibromo benzoate {phenisobromolate}
- (22) (RS)-alpha-cyano-3-(phenoxybenzyl S)-2-(4-difluoro-methoxyphenyl)-3-methyl butyrate {full SHITORNETO}
- (23) (RS)-alpha-cyano-3-(phenoxybenzyl R)-2-(4-chlorophenyl)-3-methyl butyrate {fenvalerate}
- (24) (S)-alpha-cyano-3-phenoxybenzyl (S)-2-(4-chlorophenyl)-3-methyl butyrate {esfenvalerate}
- (25) 2-t-butylamino-3-isopropyl-5-phenyl-3, 4 and 5, and 6-tetrahydro-2H- 1, 3, and 5-thiadiazin-4-one {buprofezin}
- (26) O-(2, 4-dichlorophenyl) O-ethyl s-propyl Phosphorodithioate {prothiophos}
- (27) 4-(methylthio) phenyl dipropyl phosphate {Propaphos}
- (28) O-4-BUROMO-2-chlorophenyl O-ethyl s-propyl Phosphorothioate {pro FENOSU}
- (29) Transformer-5-(4-chlorophenyl)-N-cyclohexyl-4-methyl-2-oxo--thiazolidine-3-carboxamide {HEKISHICHIAZOKUSU}
- (30) 3 - (phenoxybenzyl (1RS, 3RS;1RS, 3SR)-3-(2 and 2-dichloro vinyl)-2 and 2-dimethyl cyclopropane carboxylate {permethrin})
- (31) S, S 2-dimethylamino trimethylene dibenzene sulfonate {bensultap}
- (32) 6, 7, 8, 9, 10, and 10-hexa chloro - 1, 5, a [5], 6, 9, and 9a-hexahydro -6, 9-methano - 2, 4, 3-benzodioxo thiepine-3-oxide {Thiodan}

- (33) The 3-chloro-alpha-ethoxy amino -2, 6-dimethoxybenzyl benzoate {a benzomate}
- (34) the 2 and 2-dimethyl -1 and 3-benzoJIOKI SOL-4-IRU a methyl carbamate {vendor -- Io -- KARUBU}
- (35) s-[1 and 2-bis(ethoxycarbonyl) ethyl] O,O-dimethylphosphorodithioate {marathon}
- (36) 2-sec-buthylphenyl methyl carbamate {BPMC}
- (37) 2-(4-t-butylphenoxy) cyclohexyl prop-2-ynyl sulfonate {BPPS}
- (38) 1, 2-JIBURONO -2, 2-dichloro ethyl phosphate {BRP}
- (39) 4-chlorophenyl-4-chlorobenzene sulfonate {CPCBS}
- (40) 2-chloro-1-(2, 4, - dichlorophenyl) vinyl diethyl phosphate {CVP}
- (41) O-4-cyanophenyl O and O-dimethyl phosphoro CHIOTO {CYAP}
- (42) s-(2-methoxy-5-oxo-- 1, 3, 4-thia diazo phosphorus-4-ylmethyl) dimethyl phosphoro thio ROCHIONETO {DMTB}
- (43) O-2, 4-dichlorophenyl O, O diethyl phosphorothioate {ECP}
- (44) O-ethyl O-p-nitrophenyl Phenyl phosphono CHIOTO {EPN}
- (45) O and O-JIMERU O-(3-methyl-4-nitrophenyl) phosphorothioate {MEP}
- (46) 2-isopropyl phenyl Methylcarbamate {MIPC}
- (47) O and O-dimethyl O-4-methylthio-m-tolyl phosphoro CHIOTO {MPP}
- (48) 1-naphthyl methylcarbamate {NAC}
- (49) S-alpha-ethoxycarbonyl benzyl O,O-dimethylphosphorodithioate {PAP}
- (50) O and O-dimethyl s-phthalimidomethyl Phosphorodithioate {PMP}
- (51) 3, 5-xylyl methylcarbamate {XMC}
- (52) 2(4-ethoxy phenyl)2-methylpropyl 3-phenoxy benzyl ether {etofenprox}
- (53) (RS)-alpha-cyano-3-(phenoxybenzyl RS)-2 and 2-dichloro-1-(4-ethoxy phenyl) cyclopropane carboxylate {cyclo pro TORUN}
- (54) 1-(3 and 5-dichloro-4-(3-chloro-5-trifluoromethyl-2-pyridyloxy) phenyl)-3-(2, 6-difluorobenzyl) urea {KURORU fluazuron}
- (55) (RS)-alpha-cyano-3-phenoxybenzyl N-(chloro - alpha, alpha, and alpha-trifluoro-p-tolyl)-D-valinate {fluvalinate}
- (56) O and O-dimethyl O-4-nitro-m-tolyl Phosphorothioate {fenitrothion}
- (57) O- (2 and 2-dichloro vinyl) O and O-dimethyl phosphate {dichlorvos}
- (58) O and O-dimethyl O- (3-methyl-4-methylthio phenyl) Phosphoro thio rhe {fenthion}
- (59) (RS)-alpha-cyano-3-phenoxybenzyl 2, 2, 3, and 3-tetramethyl cyclopropane carboxylate {Foehn proper thiorin}
- (60) 3-phenoxybenzyl (1R) - cis- , transformer-chestnut SANTE mate {d-FENOSURIN}
- (61) (RS)-alpha-cyano-3-phenoxybenzyl (1R)-cis- , transformer-chestnut SANTE mate {cyphenothrin}
- (62) alpha-cyano-3-phenoxybenzyl (1R)-cis- , transformer-3-(2 and 2-dichloro vinyl)-2 and 2-dimethyl cyclopropane carboxylate {SHIPERUME thiorin}
- (63) alpha-cyano-3-phenoxybenzyl (1R)-cis- , transformer-3-(2 and 2-dibromo vinyl)-2 and 2-dimethyl cyclopropane carboxylate {deltamethrin}
- (64) (S)-alpha-cyano-3-phenoxybenzyl (R [1], 1S)-cis- - 2 and 2-dimethyl-3-(1, 2, 2, and 2-tetrabromo ethyl) cyclopropane carboxylate {tralomethrin}
- (65) 3, 4, 5, a 6-tetrahydro phthalimidomethyl (1RS)-cis- , transformer-chestnut SANTE mate {tetra-scalpel phosphorus}
- (66) 3, 4, 5, a 6-tetrahydro phthalimidomethyl (1R)-cis- , transformer-chestnut SANTE mate {d-tetra-scalpel phosphorus}
- (67) (RS)-3-allyl compound-2-methyl-4-oxy-clo vent-2-ENIRU (1RS)-cis- , transformer-chestnut SANTE mate {allethrin}
- (68) (RS)-3-allyl compound-2-methyl-4-oxy-clo vent-2-ENIRU (1R)-cis- , transformer-chestnut SANTE mate {d-allethrin}
- (69) (S)-2-methyl-4-oxo--3-(2-pro vinyl) cyclopent-2-ENIRU (1R)-cis- , transformer-chestnut SANTE mate {PURARESU phosphorus}

- (70) (R3)-1-ethynyl-2-methyl-2-pentenyl -(1R)- Cis-, transformer-chestnut SANTE mate {en penny phosphorus}
- (71) 5-benzyl-3-furil methyl (1RS) - cis-, transformer-chestnut SANTE mate {loess scalpel phosphorus}
- (72) 5-benzyl-3-furil methyl (1R) - cis-, transformer-chestnut SANTE mate {d-loess scalpel phosphorus}
- (73) alpha-cyano-3-phenoxybenzyl (1R, transformer) -2, 2-dimethyl-3-(2-chloro-2-trifluoro methylvinyl) cyclopropane carboxylate {SHIHARO thorin}
- (74) alpha-cyano-4-fluoro-3-phenoxybenzyl -(1R, transformer) 2, 2-dimethyl-3-(2 and 2-dichloro vinyl) cyclopropane carboxylate {SAIFURUSURIN}
- (75) alpha-cyano-3-phenoxybenzyl 2 -(4-difluoro methoxyphenyl)- Iso valerate {full SAISURINETO}
- (76) 2-methyl-3-phenyl benzyl (1R, transformer) -2, and 2-dimethyl-3-(2-chloro-2-trifluoro methylvinyl) cyclopropane carboxylate {bifenthrin}
- (77) 2, 3, 5, 6-tetrafluoro-4-methylbenzyl (1R, transformer) -2 and 2-dimethyl-3-(2-chloro-2 trifluoro methylvinyl) cyclopropane carboxylate {tefluthrin}
- (78) 4-(phenoxyphenyl RS)-2-(2-pyridyloxy) propyl ether {pyriproxifen}
- (79) Isopropyl (E, E)-(RS)-11-methoxy - 3, 7, 11-trimethyldodeca 2, 4-dienoate {meso PUREN}
- (80) Ethyl {2-(4-phenoxyphenoxy) ethyl} carver mate {a phenoxy curve}
- (81) Ethyl 3 and 7, 11-trimethyldodeca -2, 4-dienoate {hydroprene}
- (82) N-4-chlorophenyl - N' - 2, 6-JIFUROORO benzoyl urea {JIFURUBENZURON}
- (83) N-3, 5-dichloro -2, 4-difluoro phenyl - N' - 2, 6-difluoro benzoyl urea {teflubenzuron}
- (84) N-4-trifluoro methoxyphenyl - N' - 2, 6-difluoro benzoyl urea {triflunuron}
- (85) N-2-fluoro-4-(2-chloro-4-trifluoro phenoxy oxy-) phenyl - N' - 2 and 6-difluoro benzoyl urea {full FENOKUSURON} etc. is raised.
- [0011] As a germicide, they are (86) diisopropyls. 1, 3-dithiolane-2-ylidene malonate {isoprothiolane}
- (87) The 3-(3, 5-dichlorophenyl)-N-isopropyl -2, 4-dioxo imidazolidine-1-carboxamide {iprodione}
- (88) 5-ethoxy-3(trichloromethyl)- 1, 2, and 4-thiadiazole {echlomezole}
- (89) 1, 2, 3, a 6-tetrahydro-N-(trichloromethyl thio) phthalimide (captan))
- (90) 1, 4-dichloro -2, 5-dimethoxybenzene {chloroneb}
- (91) N-dichloro fluoro methylthio-N'-N'-dimethyl-N-phenyl sulfamide {dichlofluanid}
- (92) Tetramethyl JISURUFAIDO {thiuram}
- (93) Dimethyl 4, a 4'-(O-phenylene) screw (3-thio allophanate) {thiophanate-methyl}
- (94) 1-(4-chloro phenoxy)-3 and 3-dimethyl-1-(1H- 1, 2, 4-triazole-1-yl) butanone {thoria JIMEHON}
- (95) 2, 4-dichloro -6 -(2-chloroanilino)- 1,3,5-triazine {triazine}
- (96) (RS)-N-(1-butoxy - 2, 2, and 2-trichloroethyl) salicylamide {trichlamid}
- (97) O-(2, 6-dichloro-4-methylphenyl) O and O-dimethyl Phosphorothioate {trichloroethyl methyl}
- (98) (E)-4-chloro - alpha, alpha, alpha-trifluoro-N-(1-imidazole-1-IRU-2-propoxy ethyl IDEN)-O-torr IDEN {triflumizole}
- (99) 1-(biphenyl -4 yloxy)-3, 3-dimethyl-1-(1, 2, 4-triazole-1-yl) butane-2-Orr {BAIKORARU}
- (100) 5-methyl isoxazole-3-Orr (hydroxyisoxazole))
- (101) 2-sec-butyl -4, 6-dinitrophenyl 3-methyl crotonate {binapacryl}
- (102) Phenazine-5-oxide (phenazine oxide))
- (103) 4, 5, 6-tetra-chloro free-wheel-plate RUIDO {fthalide}
- (104) N-(p-fluoro phenyl) 2, 3-dichloro maleimide {Fluor imide}
- (105) alpha, alpha, and alpha-trifluoro-O-torr anilide {flutolanil}
- (106) N-(3, 5-dichlorophenyl)-1, 2-dimethyl cyclopropane -1, a 2-dicarboxy amide {procymidone}
- (107) 3-allyloxy -1, the 2-BENJISO-thiazole -1, 2-dioxide {Probenazone}
- (108) Methyl 1-(butylcarbamoyl) benzimidazole-2-IRUKABA mate (BENOMIRU)
- (109) 1-(4-chloro benzyl)-1-cyclopentyl-3-phenyl urea {BENSHI kuron}
- (110) N-methyl N-(p-methylsulfonyl oxy-phenyl) thio carboxamide {metasulfocarb}
- (111) 3'-isopropoxy-2-methyl benzanilide {MEPURONI i RU}

- (112) 2,6-dichloro-4-nitroaniline {CNA}
 (113) O-ethyl S'S-dimethyl phosphorodithioate {EDDP}
 (114) Pentachloronitrobenzene {PCNB}
 (115) TETORAKUROROISO-phthalonitrile {TPN}
 (116) (E)-1-(2, 4-dichlorophenyl)-4 and 4-dimethyl -2 -(1, 2, 4-triazole-1-yl)- 1-pentene-3-ol {diniconazol}
 (117) O-2, 6-dichloro-4-methylphenyl - O and O-dimethyl phosphorothioate {tolclofos-methyl}
 (118) N-propyl-N-{2-(2, 4, 6-trichlorophenoxy) ethyl} imidazole-1-carboxamide {pro KURORAZU}
 (119) (**) -2, 4'-dichloro-alpha-(pyrimidine-5-IRU) benzhydryl alcohol {fenarimol}
 (120) An N-{3-(1-methylethoxy) phenyl}-2-(trifluoromethyl) benzamide {hula truck nil} etc. is mentioned.
 [0012] As a herbicide and/or a plant growth regulator, it is 2(121)-methyl-4-chloro phenoxy ethyl butylate {MCPB-E}.
 (122) 2-chloro - 2', 6'-diethyl-N-(2-propoxy ethyl) acetanilide {pretalachlor}
 (123) alpha-(2-naphthoxy) propione anilide {naproanilide}
 (124) The 2-methylthio -4, 6-bis(ethylamino) -S-triazine {simetryn}
 (125) S-tertiary butyl-3-(2, 4-dichloro-5-isopropoxy phenyl)- 1, 3, and 4-OKISA diazo phosphorus-2-ON {oxadiazon}
 (126) S-2-methyl-piperidyl-carbonylmethyl - O and O-G n-propyl dithiophosphate {PIPEROHOSU}
 (127) 3-isopropyl - 2, 1, 3-benzoCHIAI anone-(4)-2, and 2-dioxide {bentazone}
 (128) 2-methylthio-4-ethylamino-6-(1, 2-dimethyl propylamino)-S-triazine (dimethametryn))
 (129) 3-(4, 6-dimethoxy pyrimidine-2-IRU)-1-[(2-methoxy phenyl isocyanate benzyl) sulfonyl] urea {bensulfuron-methyl}
 (130) 2-chloro -2, 6-diethyl-N-(methoxymethyl) aceto ANICHIDO {alachlor}
 (131) S-2-methyl piperidino carbonylmethyl - O and O-dipropyl FOSUFOROJICHIOETO {PIPEROHOSU}
 (132) 4-(2, 4-dichlorobenzoyl)-1, 3-dimethyl-5-PIRAZOIRU-P-toluenesulfonate (pyrazolate))
 (133) N-(butoxy methyl)-2-chloro-2-6-diethyl acetanilide {butachlor}
 (134) S-4-chloro benzyl diethyl thiocarbamate {benthiocarb} (135) 2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide {Metra Corp crawl}
 (136) S-ethyl-N and N-hexamethylene thiocarbamate {a molinate}
 (137) 1-(alpha and alpha-dimethylbenzyl)-3-P-Trier urea (dymron))
 (138) 2-chloro-N-(3-methoxy-2-thenyl)-2, 6-dimethyl acetanilide (the TERIRU crawl)
 (139) 1-(2-chloro [1 and 2-imidazo a] pyridine-3-iso sulfonyl)-3-(4, 6-dimethoxy pyrimidine-2-IRU) urea {imazosulfuron}
 (140) Ethyl =5-(4, 6-dimethoxy pyrimidine-2-IRUKARUBA moil sulfamoyl)-1-methyl pyrazole-4-carboxylate {PIRAZOSU Le FROMT ethyl}
 (141) 1-(4, 6-dimethoxy pyrimidine-2-IRU)-3-(3-trifluoromethyl-2-pyridyl sulfonyl) urea {hula ZASURU chlorofluocarbon}
 (142) Methyl =3-(4-methoxy-6-methyl-1,3,5-triazine-2-IRUKARUBA moil sulfamoyl)-2-thenoate {CHIFENSU Le FROMT methyl}
 (143) methyl =2- [3-(4-methoxy-6-methyl-1,3,5-triazine-2-IRU) ureido sulfonyl] -- benzoate {methosulfuronmethyl} (144) n-butyl-(R)-2-[4-(4-cyano-2-fluorophenoxy) phenoxy] propionate {SHIHARO hop butyl}
 (145) 2-benzothiazole-2-yloxy-N-methyl acetanilide {a MEFENA set}
 (146) 5-(2, 4-dichloro phenoxy)-2-nitro anisole {chlormethoxynil}
 (147) 1-(2-chlorophenyl sulfonyl)-3-(4-methoxy-6-methyl-1,3,5-triazine-2-IRU) urea {KURORU sulfone}
 (148) 3-(4-isopropanol pull phenyl)-1 and 1-dimethylurea {isoproturon}
 (149) 4-amino-5-tert-butyl-3-methylthio - 1, 2, 4-triazine -5 (4H) ON {METORIPUJIN}
 (150) 2, 6-dinitro-N, and N-dipropyl-4-trifluoro methylaniline {trifluralin}

(151) 6-chloro-N-ethyl-N'-isopropyl-1,3,5-triazine diyl -2, 4-diamine {Atrazine}

(152) 2-chloro -4, 6-bis(ethylamino)-1,3,5-triazine {simazine}

(153) 3(3, 4-dichlorophenyl)-1-methoxy-1-methyl urea {linuron} etc. is mentioned. Two or more kinds may be mixed and you may make into a microcapsule agent whether to be independent in this pest control agent. the content of this pest control agent to the whole system at the time of microencapsulating this pest control agent -- the potency of this pest control agent -- physical and chemical -- although it changes also with descriptions, 1 - 40% (weight % is expressed hereafter) extent is desirable.

[0013] Although when this pest control agent is an oil-like may use it as it is since this pest control agent makes it into a detailed particulate material underwater in case it microencapsulates, it is made the oily liquid which used or warms a solvent beforehand if needed, and is easy to make a particulate material. As a solvent to be used, the thing of difficulty water solubility or nonaqueous solubility is good, for example, mineral oil, such as organic chlorine, such as ether, such as butyl ether and ethyl vinyl ether, dichloromethane, and trichloroethane, and machine oil, vegetable oil, phthalic ester, adipate, phosphoric ester, maleates, a low-molecular epoxy compound, etc. are mentioned.

[0014] A role with a dispersant important in order to perform control and efficient capsulation of a particulate material by these microencapsulation is played. for example, an acrylic-acid polymerization object and an acrylic-acid (meta) copolymerization object (acrylic ester, such as a methyl acrylate, --) A copolymerization object with an acrylic-acid amide, acrylonitrile, a styrene sulfonic acid, vinyl acetate, etc., a maleic-acid copolymerization object (styrene, ethylene, a propylene, and the methyl vinyl ether --) Vinyl acetate, a copolymerization object with an isobutylene, a carboxymethyl cellulose, Polymeric materials, such as polyvinyl alcohol, xanthan gum, gum arabic, Natural polysaccharide, such as sodium alginate, and polyoxyethylene alkyl aryl ether Polyoxyethylene alkyl ether and polyoxyethylene alkyl ester A polyoxyethylene alkylphenyl condensate, polyoxyethylene alkylamino ether, Polyoxyethylene alkylamide and polyoxyethylene polyoxypropylene blockpolymers Polyoxyethylene sorbitan fatty acid ester and sorbitan fatty acid esters It is used combining that surfactants, such as an alkyl naphthalene sulfonic-acid formaldehyde condensate, etc. are independent or two sorts or more, and is usually used 0.1 - 5% of preferably 0.1 to 10% to the whole dispersed system. The dispersant of the specified quantity is dissolved in the water which is a continuous phase as operation, it carries out whether it agitates, after adding the heart matter of difficulty water solubility or nonaqueous solubility to this or adding, agitating, and a dispersed system is produced. However, a meltable dispersant can also be beforehand used for the heart matter to the heart matter, dissolving it. In addition, after manufacturing a microcapsule, these dispersants can be used, also in order to stabilize a dispersed system so that a capsule may not sediment.

[0015] As aromatic series isocyanate, 2, 4-toluene diisocyanate, 2,6-toluene diisocyanate, methylenebis - (4-phenyl isocyanate), polymethylene polyphenyl polyisocyanate, etc. are mentioned, and, as for the multiple-valued isocyanate used by this invention, tetramethylene di-isocyanate, pentamethylene diisocyanate, hexamethylene di-isocyanate, trimethyl hexamethylene di-isocyanate, isophorone diisocyanate, etc. are mentioned as non-aromatic isocyanate. moreover -- although the ratio of aromatic series isocyanate is 5 - 80% among the multiple-valued isocyanates used -- aromatic series isocyanate -- independent -- or two or more kinds may be used and non-aromatic isocyanate is independent similarly - - or two or more kinds may be used.

[0016] it is tetramethylenediamine, pentamethylene diamine, hexamethylenediamine, ethylenediamine, propylene -1, 3-diamine, diethylenetriamine, TORIECHIREN triamine, TERORA ethylene pentamine, 1, 3-phenylenediamine, 2, and 4-tolylene diamine etc., and independent [in these polyfunctional amine] about a polyfunctional amine, -- or two or more kinds may be used.

[0017] an interface pile -- the process which the process of microencapsulation depended lawfully makes (1) heart matter suspend underwater by the particle, and produces a dispersed system, and (2), although divided into two steps of the polymerization reaction process which film material is made to react on the front face of the particulate material, and produces the microcapsule by the resin film Since the particle diameter of a microcapsule is mostly determined at the process of the dispersed system of

(1), it is important for it to choose the dispersant set by the design of a capsule particle at this process and the churning approaches (an agitator kind, churning speed, etc.).

[0018] Moreover, other adjuvants, for example, the stabilizing agent of this active substance etc., can also be made to connote if needed. The manufactured microcapsule usually adds the thickener for stabilizing a dispersed system. As a thickener, mineral powder, such as natural polysaccharide, such as xanthan gum (ZANTANGAMU) and a locust bean, magnesium aluminium silicate, and a bentonite, etc. can mix and use synthetic macromolecules, such as semisynthesis polysaccharide, such as a carboxymethyl cellulose, and polyacrylic acid, by independent or two sorts or more, for example. Furthermore, synergists, such as stabilizing agents, such as antifreezing agents, such as propylene glycol and ethylene glycol, and BHT, and piperonyl butoxide, an antifungal agent, a coloring agent, an aromatic, etc. are added if needed, and it considers as the latter pharmaceutical preparation of underwater suspension.

[0019] The mean particle diameter of the microcapsule of this invention can be suitably chosen according to the description of a pest control agent, and is usually 5-40 micrometers preferably 3-50 micrometers.

[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

EXAMPLE

[Example] An example explains this invention below (the section expresses the weight section hereafter).

[0021] The polymethylene-polyphenyl-polyisocyanate 3.2 section and the isophorone diisocyanate 12.6 section were added to the example 12-methyl-4-chloro phenoxy ethyl-butylate (MCPB-E) 300 section as film material, the mixed dissolution was carried out at homogeneity, and oil was prepared. The 2% water-solution 521 of Gosenol AL-06 (Japanese synthetic chemistry company make) section was put into other containers, it warmed at 30 degrees C, and dispersion liquid were prepared. Oil and dispersion liquid were put into the container of 1L, it distributed for 5 minutes by engine-speed 8000rpm using the mixing analyzer 2500 mold (special opportunity-sized industrial company make), and the emulsion of an O/W mold was prepared. Added 20% each of mixed water-solution 13.2 section of ethylenediamine and diethylenetriamine to this, it was made to react at 60 degrees C for 3 hours, and the microcapsule liquid of the poly urea film was prepared. Furthermore, the 50% water-solution 100 of propylene glycol section and the 2% water-solution 50 section of xanthan gum were added, it mixed to homogeneity, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 20%. The measured value of mean particle diameter was 13.5 micrometers.

[0022] The polymethylene polyphenyl polyisocyanate of example 2 example 1 was changed into the 7.1 sections, isophorone diisocyanate was changed into the 8.7 sections, other raw-material charges and manufacture actuation were performed like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 45%. The measured value of mean particle diameter was 13.9 micrometers.

[0023] The polymethylene polyphenyl polyisocyanate of example 3 example 1 was changed into the 11.1 sections, isophorone diisocyanate was changed into the 4.7 sections, other raw-material charges and manufacture actuation were performed like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 70%. The measured value of mean particle diameter was 14.4 micrometers.

[0024] the polymethylene polyphenyl polyisocyanate of example 4 example 1 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 42.3 sections, 20% each of mixed water solution of the 453 sections and ethylenediamine, and diethylenetriamine was changed into the 44.1 sections, other raw-material charges and manufacture actuation performed isophorone diisocyanate in the 10.6 sections like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the multiple-valued ISOSHANE matter in the oil of this agent is 15%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 20%. The measured value of mean particle diameter was 14.2 micrometers.

- [0025] the polymethylene polyphenyl polyisocyanate of example 5 example 1 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 22.5 sections, 20% each of mixed water solution of the 478 sections and ethylenediamine, and diethylenetriamine was changed into the 34.1 sections, other raw-material charges and manufacture actuation performed isophorone diisocyanate in the 18.4 sections like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 12%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 45%. The measured value of mean particle diameter was 14.8 micrometers.
- [0026] the polymethylene polyphenyl polyisocyanate of example 6 example 1 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 7.8 sections, 20% each of mixed water solution of the 502.1 sections and ethylenediamine, and diethylenetriamine was changed into the 21.8 sections, other raw-material charges and manufacture actuation performed isophorone diisocyanate in the 18.3 sections like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 8%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 70%. The measured value of mean particle diameter was 14.7 micrometers.
- [0027] example 70-(3, 5, 6-TORIKUORO-2-pyridyl) O and O-diethyl the high ZORU #150 (Nippon Oil Co., Ltd. make) 50 section was added to the phosphorothioate (chlorpyrifos) 250 section as a solvent, and it heated at 45 degrees C, and considered as the uniform solution -- further, the polymethylene-polyphenyl-polyisocyanate 3.2 section and the hexamethylene di-isocyanate 12.6 section were added as film material, the mixed dissolution was carried out at homogeneity, and oil was prepared. The 2% water-solution 521 of Gosenol AL-06 (Japanese synthetic chemistry company make) section was put into other containers, it warmed at 30 degrees C, and dispersion liquid were prepared. Oil and dispersion liquid were put into the container of 1L, it distributed for 5 minutes by engine-speed 9000rpm using the mixing analyzer 2500 mold (special opportunity-ized industrial company make), and the emulsion of an O/W mold was prepared. Added 20% each of mixed water-solution 13.2 section of ethylenediamine and diethylenetriamine to this, it was made to react at 60 degrees C for 3 hours, and the microcapsule liquid of the poly urea film was prepared. Furthermore, the 50% water-solution 100 of propylene glycol section and the 2% water-solution 50 section of xanthan gum were added, it mixed to homogeneity, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 20%. The measured value of mean particle diameter was 10.2 micrometers.
- [0028] The polymethylene polyphenyl polyisocyanate of example 8 example 7 was changed into the 7.1 sections, hexamethylene di-isocyanate was changed into the 8.7 sections, other raw-material charges and manufacture actuation were performed like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 45%. The measured value of mean particle diameter was 10.5 micrometers.
- [0029] The polymethylene polyphenyl polyisocyanate of example 9 example 7 was changed into the 11.1 sections, hexamethylene di-isocyanate was changed into the 4.7 sections, other raw-material charges and manufacture actuation were performed like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 70%. The measured value of mean particle diameter was 10.9 micrometers.
- [0030] the polymethylene polyphenyl polyisocyanate of example 10 example 7 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 42.3 sections, 20% each of mixed water solution of the 453 sections and ethylenediamine, and diethylenetriamine was changed into the 44.1 sections, other raw-material charges and manufacture actuation performed hexamethylene di-isocyanate in the 10.6 sections like the example 7, and the microcapsule

pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 15%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 20%. The measured value of mean particle diameter was 11.3 micrometers.

[0031] the polymethylene polyphenyl polyisocyanate of example 11 example 7 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 22.5 sections, 20% each of mixed water solution of the 478 sections and ethylenediamine, and diethylenetriamine was changed into the 34.1 sections, other raw-material charges and manufacture actuation performed hexamethylene di-isocyanate in the 18.4 sections like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 12%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 45%. The measured value of mean particle diameter was 11.6 micrometers.

[0032] the polymethylene polyphenyl polyisocyanate of example 12 example 7 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 7.8 sections, 20% each of mixed water solution of the 502.1 sections and ethylenediamine, and diethylenetriamine was changed into the 21.8 sections, other raw-material charges and manufacture actuation performed hexamethylene di-isocyanate in the 18.3 sections like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 8%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 70%. The measured value of mean particle diameter was 11.5 micrometers.

[0033] The polymethylene polyphenyl polyisocyanate of example of comparison 1 example 1 was changed into the 0.16 sections, isophorone diisocyanate was changed into the 15.64 sections, other raw-material charges and manufacture actuation were performed like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 1%. The measured value of mean particle diameter was 13.9 micrometers.

[0034] the polymethylene polyphenyl polyisocyanate of example of comparison 2 example 1 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 1.3 sections, 20% each of mixed water solution of the 502.1 sections and ethylenediamine, and diethylenetriamine was changed into the 21.8 sections, other raw-material charges and manufacture actuation performed isophorone diisocyanate in the 24.8 sections like the example 1, and the microcapsule pharmaceutical preparation of 30% of contents was obtained. The multiple-valued isocyanate weight ratio in the multiple-valued ISOSHIANE matter in the oil of this agent is 8%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 95%. The measured value of mean particle diameter was 14.8 micrometers.

[0035] The polymethylene polyphenyl polyisocyanate of example of comparison 3 example 7 was changed into the 0.16 sections, hexamethylene di-isocyanate was changed into the 15.64 sections, other raw-material charges and manufacture actuation were performed like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 5%, and the aromatic series isocyanate weight ratio in the multiple-valued isocyanate whole quantity is 1%. The measured value of mean particle diameter was 10.1 micrometers.

[0036] the polymethylene polyphenyl polyisocyanate of example of comparison 4 example 7 -- 2% water solution of Gosenol AL-06 (Japanese synthetic chemistry company make) was changed into the 1.3 sections, 20% each of mixed water solution of the 502.1 sections and ethylenediamine, and diethylenetriamine was changed into the 21.8 sections, other raw-material charges and manufacture actuation performed hexamethylene di-isocyanate in the 24.8 sections like the example 7, and the microcapsule pharmaceutical preparation of 25% of contents was obtained. The multiple-valued isocyanate weight ratio in the oil of this agent is 8%, and the aromatic series isocyanate weight ratio in

the multiple-valued isocyanate whole quantity is 95%. The measured value of mean particle diameter was 11.9 micrometers.

[0037] example of trial 1; -- phytotoxicity test sample offering drugs; to paddy rice -- 3 / pot transplantation of the paddy rice of examples 1-6, the example 1 of a comparison - 2 test-method; form AKINISHIKI, and leaf age 2-3L are carried out. 40g / 10a processing of drugs are done by the active principle five days after transplantation.

Search procedure; weighing capacity of the live weight of a leave and stem is carried out one month after drugs processing, and the processing ratio for nothing (%) is computed (average of 3 ream system).

A test result is shown in a table 1.

[0038]

[A table 1]

Table 1 ----- sample offering drugs Multiple valued in oil Multiple-valued isocyanate Live weight Isocyanate ratio Inner aromatic series ISOSHIA Processing ratio for nothing Rate (y) NETO ratio (x)

An example 1 5% 20% The 90% example 2 5% 45% The 92% example 3 5% 70% 93% example 4 15% 20% 96% example 5 12% 45% The 96% example 6 8% 70% 98% ----- The

example 1 of a comparison 5% 1% 28% of examples of 35% comparison -- 95% 98% ----- although phytotoxicity was clearly seen in the example 1 of a comparison as mentioned above, and some growth control was seen in the example and the example 2 of a comparison, it was satisfactory practically.

[0039] example of trial 2; -- weeding-out validity test sample offering drugs [of Monochoria vaginalis]; -- examples 1-6 and example of comparison 1-2 test-method; 600cm² Paddy soil is put into a vat and seeding of Monochoria vaginalis is carried out. 20g / 10a processing of drugs are done by the active principle five days after seeding.

Search procedure; the number of Monochoria vaginalis which budded after [of an after / drugs processing] two weeks and after four weeks is investigated (average of 3 ream system). In addition, all Monochoria vaginalis investigated after two weeks is removed.

A test result is shown in a table 2.

[0040]

[A table 2]

Table 2 ----- sample offering drugs Multiple valued in oil Multiple-valued isocyanate Number of Monochoria vaginalis Isocyanate ratio Inner aromatic series ISOSHIA After two weeks and four weeks Rate (y) NETO ratio (x)

An example 1 5% 20% 1 Zero example 2 5% 45% 1 Two examples 3 5% 70% 2 One example 4 15% 20% 5 Five examples 5 12% 45% 8 Six examples 6 8% 70% 13 10 -----

Example 1 of a comparison 5% 1% Example 2 of 135 comparisons 8% 95% 7043 ----- Processing [no]. -- 136 93 ----- in the example 1 of a comparison,

although the example showed good validity as mentioned above, although examination two weeks after showed good validity, after four weeks, validity was inferior and the problem was in residual effectiveness. It seemed that moreover, validity was inferior by examination of the both sides of two weeks and four weeks after, bleedoff of the active ingredient to the outside of the capsule film was controlled, and it was not effectively used in the example 2 of a comparison.

[0041] example of trial 2; -- insecticidal potential test sample offering drugs [of a termite]; -- the 300 time water diluent (0.1% of active ingredients) of the sample offering drugs which put 300g of upland soil into an arrogant petri dish with an examples [7-12] and an example of comparison 3-4 test-method; diameter of 10cm, and make a soil front face common is processed to homogeneity on 24ml (3 L/m² considerable) soil front face. Six months one day after after [processing] room temperature preservation, and after [of thermostat preservation] 40 degrees C, the insects scatter of 20 worker ants and one soldier ant of a termite is carried out to a soil front face.

Search procedure; the number of dead insects of the worker ant 24 hours after a termite insects scatter is

investigated (average of 3 ream system), and mortality is computed. In addition, about a soldier ant, it considers as the outside of the object of examination.

Test-result; is shown in a table 3.

[0042]

[A table 3]

Table 3 ----- sample offering drugs Multiple valued in oil Multiple-valued isocyanate Mortality Isocyanate ratio Inner aromatic series ISOSHIA One day and six months after Rate (y) NETO ratio (x)

An example 7 5% 20% 100 95 examples 8 5% 45% 100 100 examples 9 5% 70% 100 100 examples 10 15% 20% 100 100 examples 11 12% 45% 100 100 examples 12 8% 70% 90 100 -----

----- The example 3 of a comparison 5% 1% 100 The example 4 of 45 comparisons 8% 95% 7075 ----- Processing [no]. - - 0 0 -----

----- in the example 3 of a comparison, although the example showed good validity as mentioned above, although examination one day after showed good validity, after six months, validity was inferior and the problem was in residual effectiveness. It seemed that moreover, validity was inferior by examination of the both sides of one day and six months after, bleedoff of the active ingredient to the outside of the capsule film was controlled, and it was not effectively used in the example 4 of a comparison.

[Translation done.]